

## Appendix F - Research Natural Areas

### Introduction

One of the key principles of ecosystem management is called "adaptive" management. Adaptive management recognizes that land and resource management decisions need to be made, even though the knowledge needed for making these decisions and the consequences are incomplete or uncertain. Under adaptive management, managers decide the best course with the available information, but monitor to ensure that the original decision has the desired effect. Research Natural Areas (RNAs) are key components of adaptive management, because they represent ecosystems in a natural condition. RNAs serve as reference areas to allow managers to assess the consequences of management on other similar areas. RNAs are used by scientists to understand how ecosystems function and are important for conserving biological diversity.

The first Forest Service RNA was established in 1927 on the Coronado National Forest in Arizona. Since then, the RNA system has grown to approximately 300 established RNAs nationwide, with an additional 300 or more proposed for establishment. Forest plans will propose additions to the RNA network, because of the essential role of RNAs in ecosystem management and because the ecosystem types in the Rocky Mountain Region are poorly represented. Currently, there are only 13 RNAs in the Rocky Mountain Region (Colorado, Kansas, Nebraska, South Dakota, and part of Wyoming).

**What RNAs Represent:** The goal of the RNA program is to represent the ecological diversity that occurs on National Forests and National Grasslands so that we can assess the impacts of management and conserve biological diversity. An ecosystem can roughly be defined as the plants, animals, and environment of a given area. Some of the major ecosystem types that help define this ecological diversity on the Routt National Forest include spruce/fir, lodgepole pine and aspen forests, shrublands, montane grasslands, alpine, and aquatic and riparian (streamside) ecosystems. At a finer scale, ecosystem types can be defined by several of their dominant plant species, such as the subalpine fir/Engelmann spruce/grouse whortleberry and aspen/bracken fern types. At this level, ecosystem types are referred to as plant associations or community types. Over 500 plant associations and community types have been identified on National Forests and Grasslands in the Rocky Mountain Region, and few of these are represented in RNAs.

Broad geographical differences in ecosystems are also recognized by performing RNA targeting of different ecosystem types within each Ecoregion Section (see Hierarchy of Ecological Units in Chapter 3). Variations in geology, soils, landforms, and climate influence the kinds of plants and animals that live in different regions and can also be used as features for establishing a representative RNA system. The climatic differences that occur between the east and west sides of the Continental Divide affect ecosystems and are typical of the kind of significant ecological differences that the RNA system tries to represent.

**Function of RNAs:** RNAs serve at least three important functions for the Forest Service:

1. **Reference Areas:** RNAs serve as benchmarks or reference areas for monitoring and evaluating the sustainability and impacts of land management practices on lands with similar ecosystem types. To determine the impact of

management on an area, it is desirable to have a similar area maintained in natural condition for comparison. RNAs make one of their most important contributions to ecosystem management serving as a representative system of controls for land managers.

2. **Biological diversity:** RNAs provide protection for biological diversity. A representative RNA system provides some degree of assurance that a wide array of plant and animal species are being given a high degree of protection for the future. This protection may be most important for the forms of biological diversity that ecosystems often depend upon the most and about which we know the least, such as soil microorganisms, fungi, and insects. RNAs can also be selected to provide a high degree of protection for specific populations of threatened, endangered, and/or sensitive species.
3. **Research:** RNAs provide sites for research into how ecosystems function. This research is often best accomplished in areas where ecological and evolutionary processes are functioning as naturally as possible. RNAs serve as sites for monitoring long-term change in ecosystems, such as global climate change and shifting patterns in the landscape resulting from natural disturbances by fire, floods, and insect epidemics. When scientists perform a variety of research projects in an identified RNA, the cumulative results of such work can greatly increase our understanding of particular ecosystems. One of the results of ecosystem management is that lands will be managed with the best information available. Over the years, scientific research in RNAs has helped provide that information. RNAs also serve an important educational function by providing excellent examples of ecosystems in relatively natural condition with functioning ecological processes.

RNAs help the Forest Service maintain the long-term health, productivity, and diversity of lands entrusted to its management by the public.

**Condition of RNAs:** Because RNAs represent ecosystems in their natural condition, they should be located in areas with a minimum amount of impact from human use. RNAs should also contain good examples of the ecosystem types they represent. For some ecosystem types, areas without significant human impact could not be found. In these cases, RNAs were selected from sites in the best available condition. On the Routt National Forest, a concentrated effort was made to select sites that would have minimal conflicts with existing public uses. Therefore, potential RNAs were primarily selected from lands that are presently roadless and in vacant or closed grazing allotments.

**Size of RNAs:** To serve as benchmarks, to conserve biological diversity, and to serve as research areas, RNAs must be large enough to maintain the natural processes that sustain ecosystems. For example, many of our forest, grassland, and shrubland ecosystems evolved from fire and other natural disturbances producing a landscape that is a mosaic of patches of various sizes and ages. These patches can vary from tens to thousands of acres in size. To maintain ecological processes in many of our fire-dependent ecosystems, land areas several thousand or more acres in size work best to incorporate a mosaic of successional stages or to allow for their development in the future. Current ideas in conservation biology also recognize the potentially harmful influence of some outside land uses on the ecological integrity of small natural areas. Small natural areas can degrade easily and suffer species loss.

Larger natural areas also provide greater representation for the range of natural variability which occurs in most ecosystem types and makes RNAs potentially more valuable as benchmarks for

ecosystem management. Some RNAs that represent these patterns and processes are desirable. Where possible, complete watersheds have been selected for potential RNAs, partially in order to maintain intact and naturally functioning aquatic and riparian ecosystems.

**Management of RNAs:** Management area prescriptions provide an outline for how RNAs will be managed. The intent of RNA management is to minimize human impacts that will affect the ecosystem and to maintain biological diversity and natural processes. Therefore, most potential RNAs were selected from areas that are roadless, in vacant or closed grazing allotments, in areas that have not experienced timber harvesting, and in areas that do not experience heavy recreation use. Road building and timber harvesting are not compatible uses in RNAs. Some degree of livestock grazing can be used to maintain grassland ecosystems found on national grasslands. However, livestock grazing is not a compatible use within RNAs on the Routt National Forest because native ungulates (elk, deer, and bighorn sheep) already perform this function.

**Recreational Management:** Most of the potential RNAs on the Routt National Forest were selected in areas that do not receive heavy recreational use. However, it is inevitable that varying degrees of recreational use will occur in all these areas, and recreational use will likely increase. Because RNAs serve as benchmarks and heavy recreational use can alter species populations and affect ecosystem function, recreational use is not encouraged, but not prohibited, in RNAs. For example, use of existing trails in RNAs is permitted, but no new trails will be constructed unless necessary to correct resource damage from existing trails. Existing recreational trails often provide desirable access to RNAs for research, administrative, and educational purposes.

In general, recreational standards for wilderness are applicable to RNAs. Because of the desire to find minimally impacted areas that are excellent representations of ecosystem types, some RNAs are selected from within wilderness areas. Large RNAs are valuable because they represent a large range of ecosystem conditions. Because existing wilderness-compatible recreation occurs in most large areas and because this activity currently has an insignificant impact on ecosystem function in the proposed RNAs, no restrictions will be placed on current hiker, backpacker, outfitter/guide, horseback, hunting, and fishing use. In certain instances, some of these uses have value from a natural areas perspective because through hunting, they provide more natural regulation of elk, deer, and other populations by helping to replace extirpated predators. Outfitter/guide use will continue to be allowed, subject to possible changes arising from future carrying capacity analyses. For larger RNAs, where the impacts of nonmotorized recreation are primarily confined to narrow trail corridors, significant areas of land within the RNA will be essentially free of impacts. Larger RNAs also have the advantage of providing more flexibility in accommodating recreation use.

Forest travel management plans have identified some areas as restricted to nonmotorized use. This is appropriate for RNAs and wilderness areas. However, in order to accommodate some existing motorized and mechanized uses on certain highly desirable RNAs outside of wilderness areas, exceptions may be made in the management area prescription. These are site-specific decisions made by the Forest Service, based on environmental issues, levels of existing use, and public concern. On the Routt National Forest, an example of this is the proposed Williams Fork RNA where the established practice of mountain bike use on a maintained Forest Service trail will continue to be allowed. Because of the expert nature of this trail, mountain bike use is minimized.

Other aspects of recreational management in wilderness are also appropriate to RNAs. For wilderness management, a Limits of Acceptable Change process is available for monitoring and evaluating the impacts of increased recreational use. In some instances, where recreational

impacts in wilderness have increased above an acceptable level, methods have been implemented to lessen these impacts, such as placing restrictions on camping near water sources or establishing a permit system. This process of monitoring and evaluating recreational impacts is also desirable for RNA management. For newly established RNAs, existing levels of recreational use will be allowed unless specific restrictions have been identified in the management area prescription. Existing permits with commercial recreation providers, such as outfitter/guides, will continue, subject to the normal permit review processes that apply to use on all National Forest System lands.

**Fire Management:** Natural fire frequencies are desirable on RNAs. However, excessive build up of fuels from decades of fire suppression, valuable resources outside RNA boundaries, and special old-growth values inside some RNAs, may preclude allowing some natural fires to burn. Site-specific fire management plans may need to be developed for some RNAs in order to identify circumstances in which natural fires can be allowed to burn freely and to design specific management-ignited, prescribed fires to mimic natural fires.

**Exotic Species Management:** Exotic (non-native) species are not desirable in RNAs. Some particularly invasive and unpalatable plant species, such as knapweed and Canada thistle, would be good targets for control in RNAs and elsewhere on public and private lands. However, some non-native weedy plant species, such as Kentucky bluegrass and cheatgrass, have become almost naturalized into many western landscapes and may be prohibitively expensive or almost impossible to eradicate. Decisions on the threats of exotic plant species to RNA values and possible control techniques, including the use of herbicides, will need to be made on a site-specific basis. The Colorado Division of Wildlife has introduced mountain goats, which are found further north in the Rocky Mountains but are not known to be native to Colorado. The presence of these species is not desirable in an RNA; however, their presence may be inevitable in some areas that would be very valuable additions to the RNA system.

As with the management of all public lands, the management of RNAs should be based on a firm scientific basis with concern for long-term sustainability, ecological values, and public uses. These are some of the central tenets of ecosystem management. Research Natural Areas are an important natural legacy for the future and need to be managed accordingly.

## Descriptions of Proposed Research Natural Areas

Short summaries for each of the proposed RNAs are presented below. Complete descriptions of each area were written in 1995, based on Ecological Evaluations developed by the Colorado Natural Areas Program (CNAP), and validated by Routt National Forest personnel familiar with on-the-ground conditions. These complete descriptions are part of the Administrative Record on file and available for review at the Forest Service Office in Steamboat Springs, Colorado.

### Silver Creek Proposed RNA

The 12,520-acre Silver Creek proposed RNA is located on the Yampa Ranger District on the west flank of the Gore Range, west of the Continental Divide. The area is entirely within the Sarvis Creek Wilderness Area and includes all of the upper Silver Creek watershed, with elevations ranging from 8,960 to 10,680 feet.

Most of the area is representative of mid-elevation subalpine coniferous forest dominated by lodgepole pine that has remained undisturbed by logging. Some lodgepole pine stands contain many individual trees that are larger and older than those found in most lodgepole pine forests. Most of the lodgepole pine forest has an understory of small spruce and fir, indicating a very slow succession to spruce/fir forest. Smaller areas of old Engelmann spruce/subalpine fir forest

occur in moist and sheltered sites that have escaped recent fires. Small areas of aspen occur on rock falls and scree slopes. The area also provides good representation for some types of sedge fens and willow-dominated wetlands, as well as the riparian communities along Silver Creek. The area is also notable because of the relatively gentle mountain topography that has not been influenced by Pleistocene glaciation.

Access to the area is limited to foot or horse travel because of the existing wilderness designation. The recreational trail along Silver Creek receives a moderate amount of use, primarily by anglers and hunters. The Silver Dome, located in the northeast section of this area, receives light use as a recreational climbing area. The area is part of the Service Creek cattle and horse grazing allotment, which has not been grazed since 1963.

### **Mad Creek Proposed RNA**

This 19,420-acre area on the Hahns Peak/Bears Ears Ranger District is partially contained within the Mount Zirkel Wilderness. This ecologically diverse area extends from montane forests to alpine tundra, with elevations from 7,400 and 11,924 feet, and includes the entire watershed of the South Fork of Mad Creek. The Continental Divide forms the eastern boundary of the area. In contrast to the Silver Creek area, most of the Mad Creek area has been extensively sculpted by the forces of glaciation.

Large, subalpine grasslands, dominated by tufted hairgrass, form a broad transition between the small area of alpine tundra above and the more extensive subalpine forests below. Small, but important, areas of old-growth Engelmann spruce/subalpine fir forest have been found to harbor relatively rare plant species, such as the northern wake-robin. At their highest elevations, spruce/fir forests often form ecologically interesting areas of ribbon forest. At lower elevations, there are extensive stands of aspen and some shrublands on south-facing slopes. The Mad Creek area has several lakes, three of which contain the Colorado River cutthroat trout, a Forest Service sensitive species. The area also has high quality riparian plant communities.

A major wilderness trail occurs along the eastern boundary and provides access primarily to several of the mountain lakes near the northern end of the area. Of these, Luna Lake receives the most use. There are no other Forest Service system trails in the area. A few social trails occur both in the wilderness and in the southern part of area near the Forest boundary. The area is part of the Soda Creek grazing allotment, which has not been grazed since 1982.

### **Williams Fork Proposed RNA**

Located on the Middle Park Ranger District west of the Continental Divide, this 22,380-acre area is typical of much of the very high alpine landscape that occurs along the Front Range. Containing a number of peaks over 13,000 feet, this area includes the complete upper watersheds of the South and Middle Forks of the Williams Fork. A number of well-developed glacial cirques occupy the upper ends of these creeks. Elevations range from 9,200 to 13,500 feet.

This area contains diversity of alpine ecosystem types occurring over a very wide range of elevations, slopes, and aspects. The Williams Fork proposed RNA also contains extensive areas of subalpine forest, wetlands, and riparian ecosystems, including a large area of old-growth Engelmann spruce/subalpine fir forest. Colorado cutthroat trout are found here.

The Forest Service trail that runs up the South Fork of the Williams Fork and then down Bobtail Creek receives a moderate amount of recreational use. This area has been closed to motorized

use. The area is part of the Ptarmigan and Jones-St. Louis grazing allotments, which have been vacant since 1982.

### **Never Summer Proposed RNA**

This 9,260-acre area on the Parks Ranger District is found on the west slope of the Never Summer Mountain Range, east of the Continental Divide. Elevations range from 9,050 to 12,440 feet. Never Summer contains a complete cross section of the geology of the western slope of the Front Range, from Mesozoic sedimentary rocks forming the hogback on the west side of the potential RNA to the Precambrian gneisses and granodiorites of the Continental Divide on the east.

The Never Summer area is representative of the mid- to high-elevation zones, such as montane, subalpine, and alpine vegetative zones. Lower elevations are dominated by lodgepole pine, with small patches of aspen and spruce/fir. The upper elevations transition from Engelmann spruce/subalpine fir into subalpine grasslands and rocky peaks.

Wetlands and riparian ecosystems are dominated by willow/beaver pond complexes that currently support a dense population of moose. Some of the ecological values of this area include wetlands for wood frogs and other sensitive amphibians. Moose and river otter have been introduced. Forested habitats support northern goshawk and golden crowned kinglets.

The Never Summer proposed RNA currently receives a moderate amount of recreational use. The area is bounded on three sides by roads heavily used in the summer and fall (Forest Roads 750, 740, and 758). A trail (Forest Trail 1141/1186) passes through the area and accesses the Never Summer Wilderness and is traversed by hikers and livestock users. This trail also forms a portion of the congressionally designated Continental Divide National Scenic Trail. Park City and Teller City, historical sites from the silver mining era, are adjacent to Forest Road 750. Three trailheads, now just outside the proposed boundary, provide trail access to the wilderness and pass through the proposed RNA.

There are a number of patented mining claims (in-holdings) near the end of Forest Road 758. The Illinois/Owl Mountain Cattle and Horse allotment, consisting of 211 suitable acres, are within the proposed RNA supporting a total of 176 cow/calf pairs. The far eastern portion of the RNA is within the Bear Paws Sheep Allotment, which has been vacant since 1974. There are no current or expected plans for placing livestock back into this area.

### **Kettle Lakes Proposed RNA**

Occurring east of the Continental Divide on the east side of the Park Range, this 6,790-acre area is on the North Park Ranger District. The western two-thirds of the area occurs within the Mount Zirkel Wilderness Area. Elevations range from 8,600 to 10,600 feet. This area contains over a hundred small kettle lakes and extensive wetlands surrounding and adjacent to these lakes. The lakes were produced by glacial scouring and melting iceblocks during the Pleistocene era, and most of them have no inlet or outlet. This is one of largest and densest concentrations of glacially derived lakes in Colorado.

The wetlands include sedge-dominated fens, willow carrs, and floating mats of vegetation. Most of the surrounding forest is lodgepole pine. The extensive wetlands of Kettle Lakes provide habitat for known populations of Forest Service-identified sensitive species, including the roundleaf sundew, wood frog, northern leopard frog, and boreal western toad.

There are no Forest Service trails; recreational use of this area is negligible. The area is part of the North Fork cattle and horse grazing allotment, which is currently being grazed. However, the portion of the allotment within the proposed RNA is not very suitable for grazing and only rarely used by cattle.

### **California Park Proposed RNA**

This 700-acre area on the Hahns Peak/Bears Ears Ranger District is found west of the Continental Divide in the Elkhead Mountain Range. Elevations range from 7,800 to 8,700 feet.

Most of the area is representative of the mid-elevation foothills and montane vegetative zones, and includes open sage meadows and mature aspen stands with understory vegetation in the carrot family. Stukey Creek, Sugar Creek, and First Creek run through the proposed RNA. Beaver activity is heavy, creating numerous pond complexes and wetlands. The pristine aspen stands appear to represent what some might consider to be a climax aspen site. These stands are used extensively by elk for calving and early summer transitory range.

Breeding Columbian sharp-tail grouse occur on the sage sites. Leopard frogs breed within the Sugar Creek drainages, and sandhill cranes nest and forage throughout. All three species are designated as "sensitive" by the Forest Service.

The California Park proposed RNA currently receives light recreational use during the summer months, most often by horseback riders and hikers. Use increases tremendously during hunting season, because of the high elk occupancy and the access provided by Trail 1144. This trail is also groomed by a recreational snowmobile club and serves as part of their winter trail system. Small portions of active livestock allotments are included within the proposed RNA. These allotments provide forage for both cattle and sheep.

### **Black Mountain Proposed RNA**

This 1,500-acre area on the Hahns Peak/Bears Ears Ranger District is found in the Elkhead Mountain Range east of the Continental Divide. Elevations range from 8,500 to 9,200 feet. Most of the area is representative of the mid-elevation foothills and montane vegetative zones and includes aspen stands and mixed aspen/coniferous stands with lodgepole, spruce, and fir.

Heavy beaver activity within the numerous perennial and intermittent drainages that intersect the proposed RNA has created a very high density of ponds, when compared to most other areas on the west end of the Routt National Forest. Some waters maintain reproducing populations of Colorado cutthroat trout. Sandhill cranes and northern goshawks nest and forage within the proposed RNA. Each of these species are designated as "sensitive" by the Forest Service.

The Black Mountain proposed RNA currently receives a light amount of recreational use during the summer. Use increases dramatically during the fall hunting season and is moderate during winter for snowmobiling. Old seismograph roads intersect the proposed RNA, allowing easy access for recreationists and livestock. Earlier road obliteration efforts, that included the reseeding of roads with non-native grasses, have influenced the area's vegetation. The proposed RNA is part of the Welba Sheep and Goat grazing allotment, but is currently being grazed by cattle.

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